

... only to get the required test signal input impedance matching.

This design is set up for a differential gain of 7.5 from a maximum 2-V_{pp} differential input to the maximum required 15-V_{pp} differential output swing. Since the OPA2681 is a wideband, high-slew-rate, current-feedback design, ac performance holds up very well as the gain is increased to this 7.5 value. The output stage for this device has also been optimized to deliver high currents with minimal

The dc gain is set to 1 by the microfarad blocking capacitor in series with the 200-1/2 gain resistor to pass the +6.5-V input bias voltage on to the output as an optimized center point for the output swing. With no input signal present, both outputs are sitting at +6.5 V, and no current is passing through the output transformer. On the output, two 12.5-Ω resistors match into the 1:2 transformer where its secondary emulates a 100-1/2 load while still matching into a 50-1/2 measure-

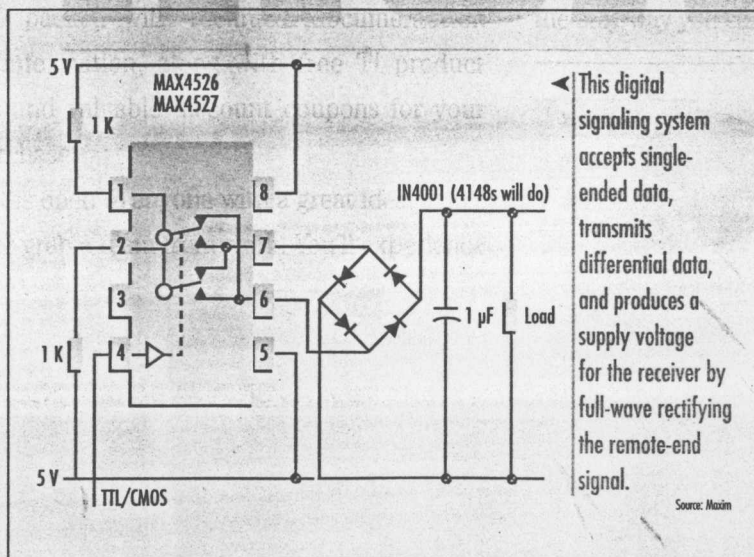
tributes to a very low harmonic noise levels out of the driver. The maximum ADSL upstream frequencies are in the 138-kHz region. Intermodulation testing with two-tone, full-power 7.5 V_{pp} on each tone at 500 kHz showed nearly 80-dBc spurious-free dynamic range for the circuit. Even better performance may be expected for the lower 138-kHz upstream frequencies used in the asymmetrical digital subscriber line.

►► CONTINUED ON PAGE 114

1649 Digital signals, power ride same wires

This signaling system enables the transmission of digital signals and power over the same two wires. The signal waveform is rectified at the remote location to provide a stable supply voltage and modest load current—about 1 mA maximum—for the receiver.

For conventional single-ended data, a series of "0s" can allow excessive droop in the receiver's supply voltage. To avoid that problem, differential data (5 V to 20 V) is transmitted, pseudo RS-485 style, from a single-ended logic-level input (TTL or CMOS). The differen-



◀ This digital signaling system accepts single-ended data, transmits differential data, and produces a supply voltage for the receiver by full-wave rectifying the remote-end signal.

Source: Maxim

BY SIMON BRAMBLE
MAXIM INTEGRATED
PRODUCTS
READING, U.K.

tial drive and full-wave rectifier at the receiving end ensures that a supply voltage is always present for the remote receiver.

Current-limiting resistors at the supply of the transmitter inputs prevent damage in the event of a line short. Values of 1K are optimum. Higher values produce excessive switching noise at the chip side of the resistors, caused by charge injection from the switches. Adequate decoupling of the supply rails also helps to minimize noise.